DNV Comments to RIN 1010-AD30
(PLEASE NOT THAT SOME OF THE ANSWERS ADDRESS ONE OR MORE QUESTIONS)

Program Area: Access to OCS lands and resources

Question 5:
The direct comparison between wave, current and wind energy must consider the different stage of technology development (and therefore uncertainty) of the technologies involved. For wave and current energy the MMS should require assessments to demonstrate the maturity and suitability of the technology including safety/survivability, reliability and availability to achieve the power take-off expected. A cost model should be used taking into account the lifecycle costs and any financial costs/incentives. For wind turbines the MMS should require similar assessments to document proposed wind turbine power curves. Considering the history of the application and true costs for installation and operation of wind farms, it should be possible to derive possible return on the wind farm. For all renewable energy sources allowance should be given to gradual technology progress and the impact of scale factor.

Question 9:
Where the potential resources are satisfactory to wind and wave / current, it may be possible that they are developed side by side sharing infrastructure.

Question 11:
The methodologies given in /1/ and /3/ can be used to assess the technology aspects of fair competition, identification of areas for research and further tests for wave and tidal. Those references provide methodologies to demonstrate how to achieve safety levels, reliability and availability as well as the power take-off expected. The methodologies also address the levels of uncertainty for the particular development phase (e.g., conceptual, detailed design, prototype stage, production model with few installed units or if a production model that has a representative number of units installed and in operation) and can be extended to include life cycle costs. In this way the fair competition of development concepts can be achieved by use of a same methodology.

Program Area: Environmental information, management and compliance

General Issues: K
Although the regulatory work can be generic enough to cover wind, wave and tide, some aspects should be very distinctive while considering the development of technology and maturity of the sector. While the wind industry has settled into a common concept with standards and certification (of the turbine and project) already in place (ref. /2/ and /4/), wave and current devices are in an early stage of development with several different competing concepts and several aspects regarding required reliability to be balanced with costs. In this case, further incentives, research and a legislation that does not curtail initiatives are essential.

Sponsored by the Carbon Trust (www.carbontrust.co.uk) and under the Technology Acceleration programme DNV developed a *Guideline on design and operation of wave energy devices* (ref. /1/). The Guideline was developed with the participation of several wave energy device developers, consultants and other stakeholders, and is based on the methodology given in reference /3/ using relevant technology and knowledge from the Offshore and Shipping industries.

The objective of the Guideline is to address safety, environment, functional requirements and asset protection in the context of the renewable energy. It covers the analysis of concepts, identifying

where the technology is new or where it is proven but used in a different application or outside the normal working parameters / environment. Differently from normal standards, the Qualification and the Guideline also addresses functional requirements and reliability aspects. DNV will soon issue a Service Specification (ref. /5/) defining the scope and process for certification and classification of marine devices (wave and tidal). This OSS also refers to the Qualification process and the technical aspects presented in the Guideline on design and operation of wave energy devices.

General Issues: M
There are regulatory regimes for the wind sector in some countries in Europe, such as Denmark, Netherlands and Germany. In other countries, the certification of turbines is normal practice (financial and insurance concerns) although not required by National Governments. As part of the permit for installation of wind farms a consultation process is normally required and this process involves all stakeholders. A detailed description of the process is given in the *Guidelines for consultation on Offshore Wind developments* that can be found at www.bwea.com. For wave and current energy projects there is no regulatory framework, although permission for installation of wave / current farms or prototypes are given normally based on commitment to decommissioning and environmental aspects. Normally, incentives under reduction of carbon emissions and other technology development schemes are usually applied.

For wind, wave and current energy the National Authorities have a mandate similar to that described for the MMS in order to ensure the best return for the use of the lease. In the UK this is carried out by the Crown Estate for the offshore region up to 12 miles from shore with the Health and Safety at Work legislation to be considered and Maritime Coastguard Agency (MCA) requirements regarding signalling, the use of shipping lanes and rescue. Beyond the 12 mile limit (we are not aware of any application beyond this area except for the Beatrice Wind Farm Project near an oil and gas installation in the UK North Sea sector), it is expected that the Department for Trade and Industry (DTI) will have the overall authority regarding leases and the use of the sector, with the MCA and HSE also involved.

Program Area: Operational activities
See also comments to Environmental information, management and compliance.

General Issues: O to V
Permitting of pilot projects should require a DWOP-like document with clear reference to the process of technology qualification. This should include hazard and failure mode analysis, and reference to the standards and practices being used e.g. “Guideline on design and operation of wave energy devices” (www.carbontrust.co.uk) and DNV OS-J101 or IEC WT-01. These standards and guidelines include issues such as safety, functional requirements, asset protection and environmental aspects during construction, production and removal, monitoring and inspections as well as uncertainties in the technology.

Questions 19 to 21
Given the novel aspects of the technologies being considered and the recent offshore experience in the GOM the MMS should adopt a CVA-like program. The independent validation of such energy projects by a qualified third-party verification agency will add credibility to the process. Different from verification to a prescriptive standard however the CVA process must allow for qualification of technology as part of the project. The CVA approval by the MMS will also require closer scrutiny as this work requires new expertise and experience.

References: (available upon request)
/1/ Guidelines on design and operation of wave energy device, May 2005
/2/ DNV OS-J101, Design of Offshore Wind Turbine Structures

/3/ DNV RP-A203, Qualification Procedures for New Technology
/4/ IEC WT-01, IEC System for Conformity Testing and Certification of Wind Turbines – Rules and Procedures
/5/ DNV OSS-312, DRAFT - Certification and Classification of Tidal and Wave Energy converters